

Hair Anatomy and Material Science

Soheyb Timar

Student, Law, Islamic Azad University, Qeshm Island, Iran.

Abstract

Each material should be selected according to the thickness of the hair, the sex of the hair, the amount of damage to the hair and the climatic environment and the internal marks and should be done in the correct manner according to the material structure. Each one has a piece of the puzzle. When a material does not fit into one of these features, it can cause damage such as fragility, elasticity of the hair, as well as disruption of the PHP hair structure leading to hair loss. So based on the structure of a material we have to get it right. Knowledge of thermal items is a necessity for a cosmetologist. If all the features are in the right direction but the thermal items are inappropriate for the hair and material. Certainly, as a result of efficiency, they have little impact. Unless a hair treatment is done, a person has more plans to use health care. But after a therapy for at least 3 months, he or she will face limited health care. Because the hair will be more sensitive and the therapy will have limitations for the person.

Keywords: Hair Anatomy, Materialology, Keratin hair, amino acid, collagen, Peptide, Acetic acid, Hair cuticle, Hair Cortex, Hydrogen bonding, Disulfide bond, Formaldehyde, Formalin, cold and warmth, Yoon, Titanium, ceramic, Provitamin B, PHP Hair.

Hair follicle: Cuticle, Cortex, Medulla

Cuticle: The outermost layer of hair structure which is consisted of 6 to 8 layers.

Cuticle contains hydrogen bonds.

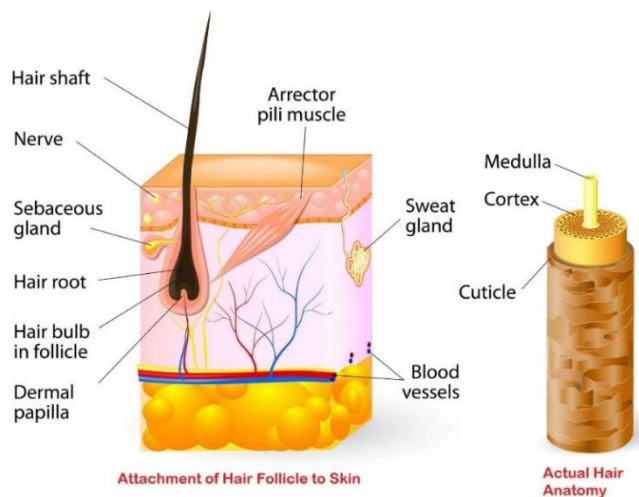


Figure 1

Hydrogen bonds:

Hydrogen bond are referred to the bonds that temporarily are responsible for the fixation of the hair strands

Temporarily: It means that their flexibility is 1 hour to 1 week.

Example: Like shaping hair with only water or using hair fixators.

Split hairs, frizzy hair and fragility all are related to this tissue.

The main function of the cuticle is protecting the cortical tissue.

Address for correspondence: Mr. Soheyb Timar, Student, Law, Islamic Azad University, Qeshm Island, Iran.

This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work noncommercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to cite this article: Timar, S., Hair Anatomy and Material Science. Arch Pharma Pract 2020;11(S1):104-17.

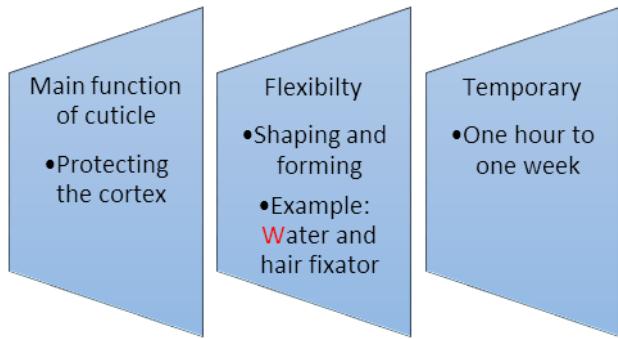


Figure 2: Overview

Cortical tissue: It is the most important protective layer of hair for preventing long-term damage.

Disulfide Bonds (Sulfur Tissue): They are known as the strongest and firmest hair bonds, their destruction or action will have long-term effects.

Difference between hydrogen and disulfide bonds:

1. The maximum effect left by the destruction of hydrogen bonds is 6 months, while in terms of the disulfide bonds this effect is 1 year to be permanent.
2. As long as the hydrogen bonds are damaged, the hair remains firm, but when the disulfide bonds are damaged or destroyed, the hair loses its strength.
3. Hair dying can be done as long as the hydrogen bonds are damaged, but once the disulfide bonds are destroyed, the hair will not be able to absorb the pigment.
4. Fragility damage occurs when the cuticle tissue of the hair becomes dry (it loses the necessary fatty acids). As a result, this dryness affects the cortical tissue of the hair when the hair loses its static flexibility (Strength).
5. Elasticity: When the cortical tissue of the hair is destroyed or seriously damaged (disulfide bond), we will encounter elastic fibers... Elasticity of the hair strands is not directly related to the hair cuticle tissue [1].

Table 1: At a glance

Difference	Hydrogen bonds	Disulfide bond
Maximum destruction	6 months	One year to permanently damaged
Strength of hair when it is damaged	Won't be lost	Will be lost
Hair dyeability	Exists	Doesn't exist
Hair friability when it is damaged	Happens	-
Hair elasticity when it is damaged	-	Happens

Hair pigments are injected by the matrix into the hair follicle Matrix: The task of hair pigments is the responsibility of the Matrix

Anything that happens to the hair as a coin spot is related to the nerve

Medulla (cerebral nuclei or brain tissue) is the most internal layer of the hair follicle

Its presence or absence is not very effective on the hair but it can * support the cortex of the hair*



Figure 3: Hair support procedure under normal conditions



Figure 4: Hair support procedure under damaged conditions

Therapies: Substances associated with ironing lose their normal support conditions

Q: How long is the effect of therapies on the hair (ie, how long does it take for hair to fully absorb the substances inside itself, cortical tissue is also included)?

Answer: It is 21 days

If we support the cuticle by 100%, the cuticle will support the cortex by 30%.

So we need to repeat the course three times to fully repair the cortical tissue

The principle of a Botox theorem (cortex repair) is three courses of 21-day

What is Amino Acid / Peptide / Collagen?

The main components of hair keratin include: cysteine, proline

1 keratin = with 2 cysteine + 1 proline

Amino Acid in the material: Creating a layer of fat on the hair cuticle tissue that sometimes penetrates the cuticle depth.

Hair lipid are citric acids which contain active amino acids and cause hair to become greasy and shiny [2].

Collagen: This structure dries one or more layers of hair cuticle tissue, which strengthens hair and adjusts hair pH.

Peptide: This structure eliminates 1 to several layers of lipid from the cuticle tissue of the hair, which results in mild dryness and thinning of the hair.

The main task of penetrating to the hair depth and smoothing the hair strand is on the peptide.

Smooth = peptide

Amino acid + collagen = peptide

For example: Chocolate has 50% smoothness and 50% revival then peptide 50% and total collagen amino acid is 50%.

Note: In the structure of materials, amino acids and collagen are related to the hair type

Hair type: Dry / Normal / Greasy / Mixed

Amino acids and collagen are effective on each other. If the active amino acid is in the structure, the amino acid will be more effective.

But if active collagen is in the structure, the collagen will be more affected.

What does active amino acid and collagen mean: When we said active amino acid, it means that collagen is first injected and then amino acid is added.

In active collagen, first amino acid is injected then collagen is added.

Collagen recognition in materials and therapies:

In fact, collagen is highly concentrated in the material

Crude or high percentage effective collagen are generally white or cream and include a very, very low amount.

Exception: If during the therapy, materials that were used get dried on the hair strand like wood or plaster, there would be high amount of collagen in it.

All materials that get dried on hair should be washed + collagen

Sometimes amino acids and collagen are not effective on each other.

In materials that collagen and amino acids do not affect each other, the hair is ineffective on them when the hair is normal.

Dry or frail hair type: Treatment with effective or active amino acids

Oily or elastic hair: Treatment with effective collagen

Ordinary hair with elasticity damage: Treatment with collagen-containing active amino acid

Factors affecting the scalp

Hair follicle, cortical tissue (hair shaft), cuticle

Gastrointestinal system

Impairment of fat content adjustment in the liver: It causes the hair and scalp to become greasy and then to fall off.

Anemia (Iron): People who are anemic generally have dry cords and dry scalp that lead to hair loss (under normal conditions: means that other vital signs should be normal such as liver, body heat, thyroid, etc.).

Note: Hair loss caused by anemia happens without warning unlike the previous part where hair loss due to greasy hair was noticed, but here it starts without any warning.

Thyroid: Thyroid dysfunction has a much stronger effect on hair loss than the previous ones, so not only does it cause hair loss, but also it causes the loss of eyebrows and eyelashes.

Body heat: It accumulates fat in the scalp.

Hair thickness

The amount of hair thickness is related to the cortical tissue.

Thin, medium, thick

When we intend to do a smoothing therapy, we are actually removing one or more layers of hair thickness (cuticle tissue). And when we're going to thicken the hair, we're actually adding one or more layers to the hair cuticle tissue.

The increase of hair thickness is done with collagen for 21 days to 6 months.

Hair Type: greasy, dryness, normality and mixed (1 Day greasy, 1 Day Dry).

Factors Affecting Hair Loss:

Gastrointestinal system: (body heat, thyroid, liver fat and iron deficiency (anemia), nerves, stress, anxiety, body heat, use of improper health items, direct radiation, sweat, sodium, sulfate, ammonia, formalin)^[3]

Knowledge:

Weather:

Affects hair therapy reaction.

Example:

When someone performs keratin therapy or hair coloring and lives in a sultry climate, sultry environment increases body sweating and body sweating contains sodium and bacteria which affect these therapies. Therefore, we need a protective layer to prevent sweat from intermingling with the hair.

For sultry environments, we use protectors such as serum and oil to be 100% absorbed into the hair cuticle tissue.

For dry climatic conditions (such as Yazd) we need oil and serum to protect the hair cuticle tissue which are not 100% absorbed to the hair, which means they create a fatty acid layer on the hair cuticle tissue.

Menstrual period:

During this period, the body reaches its maximum temperature; in addition, people experience skin irritation (increased blood circulation) then hair growth.

Pregnancy period:

Q: Why shouldn't pregnant people use therapies, especially discoloration?

Reply: Any action on the mother affects the fetus (First 4 months).

During pregnancy, Botox, Protein, Mask, Serum and Oil without ironing and hair dryer and any item which could damage cortical tissue is prohibited. Maximum pregnancy time therapies could be using herbal dyes such as henna.

MATERIALOLOGY

Amino acid (amino acid): One or more layers of fat on the hair cuticle tissue that sometimes penetrate into the depth of cuticle tissue, such as small diameter amino acids.

Amino acids

Arginine, cysteine, lysine, methionine

Any therapy or word associated with such words is related to amino acids (word play)

Cysteine, Methionine, Lysine, Glycine, Arginine, Cystine (different from Cysteine), Tyrosine, Glutamine, Proline, Alanine, Isolysine, Valine, Leucine, Listening, Onine.

keratin = cysteine + proline

Amino acids that move following the peptide and penetrate into the cuticle tissue.

Single and married women between the ages of 17 and 25 have high body temperatures.

Amino Acids cause strong hair, flexible hair, recovered hair (Loss and Fragility), shiny hair (Radiance).

The amino acids have a direct relationship with the type of the hair and have no relation to the thickness of the hair.

Active amino acid (effective amino acid): It means that the effect of the amino acid is more than collagen.

Collagen

All information is about normal hair and gastrointestinal system

This structure dries one or more layers of the cuticle tissue.

High body heat / liver fat / fatty acids / mixed and greasy hair should use collagen-containing materials, otherwise, irreparable damages would happen.

Duration of the therapy is one day but treatment is in the long term.

Collagen is related to the type of the hair.

Peptide

These structures destroy one or more layers of the hair cuticle tissue (thinning hair strand) and penetrate deep into the hair cuticle tissue. It's kind of corrosive.

Result: Any healthy hair may be damaged after any therapy or keratin therapy.

LPP

LPP: It is a kind of amino acid but not fatty enough to affect the hair.

It is based on Pro-vitamin B; it is the main vitamin that the hair needs.

A number of colors are specified in the rules of universal analysis.

Orange and lighter than orange.

Superior structure of Pro- vitamin B

Reducing hair loss, increasing hair growth, repairing fragility and elasticity.

The peptide cannot eat lpp because it is based on Pro- vitamin B.

The higher the peptide content in the material, the more we will confront mild drought, so we conclude that peptides are effective on amino acids, for example:

If a brand has a 70% of peptide content, it will affect amino acid, then as long as the peptide content in the material is more than 60%, the hair type will no longer affect the material.

Peptides destroy one or more layers of cuticle tissue so they can be effective on collagen.

Collagen is effective on the peptide; it prevents the hair from thinning because the peptides cause the hair to become thinner, but the collagen will thicken and tighten the hair.

One of the reasons for the presence of collagen in materials that contain more than 50% peptide or very high formalin is to prevent over-thinning or damaging the hair.

Collagen effect on amino acids: Collagen has a 100% effect on amino acids; so, they can absorb all the fatty acids of the cuticle tissue.

Amino acids do not affect the peptide.

Amino acids are opposed to collagen, but if we do collagen therapy first, then amino acid therapy be applied, we cannot remove the collagen layer with amino acid and we can only add a layer of fat to the cuticle tissue.

It is effective on the hair type, i.e. it makes the hair greasy.

Pro-Vitamin: (B1-b12)

The presence of this vitamin strengthens the inner fibers of the hair and its deficiency causes hair loss.

Glutamine

It is not present in the hair structure, but people with hair loss can use it as a treatment.

Q10 Quanism

The most effective cortical tissue-related vitamin that can inject many disulfide bonds. That leads to strengthen the hair strand and regulates the acid and alkaline of the scalp and the hair.

Sulfate

Sulfates are stimulants of the scalp that increase the mobility of the scalp following blood circulation.

Negative effect: As long as a person has inflammation on the scalp, they cannot use a high-sulfate material, because the

higher the sulfate, the more irritating the scalp, which results in a higher circulation rate in that region. So as the circulation increases, the previous inflammation spreads which makes the person experience severe itching on all parts of the scalp.

Sulfate effect:

Negative effect: Sulfates can partially open hair follicles. Increasing the opening of follicle results in the removal of minerals within the hair structure, resulting drought in the strands.

Positive effect: In normal conditions (ie no hair treatment), they are an ideal option for greasy hair. All anti-dandruff shampoos contain sulfate.

Sodium chloride

It is one of the most powerful antibacterial (disinfectant) agents for the cuticle tissue of the hair that at the same time helps to strengthen the hair strand (mild) and root (under normal conditions).

Sodium

They are corrosive to amino acids; so if we do a therapy with sodium, sometimes we could burn the hair.

Citric acid

Adjust the pH of the hair and create one or more layers of fat on the cuticle tissue based on its diameter (citric acid). If it is fine, the diameter of the citric acid can penetrate into the cuticle tissue but may stay on the cuticle tissue if its diameter is large.

Paraben

It is a carcinogen and the higher the amount of it in the materials, the more the expiration date of the material is, except oils.

Formalin

It is an activating element in the material and the higher the amount of it in the materials, the stronger the accelerating process.

Increases peptide's ability to penetrate.

Increasing the amount of 1 to 12 percent of formalin in the material will result in more gas. But as far as formalin is used from 12% to 25% in a material, the principles of gas producing will be different.

It means the higher the formalin percentage exceeds 12% per material, we will have much lower gas levels, such as the formalin used in rebounding and non-gas elements (not all elements).

The best, with the lowest disadvantage, and most effective rate of efficiency for a material is 4%. We can clearly see the

smoothness of the hair in materials that have 4% or more formalin^[4].

Materials that:

Have smoothness greater than 50%, have 4% formalin or more.

Have smoothness less than 50%, have formalin less than 4%.

Materials with peptides below 50% require formalin below 4%. More formalin can be used but it should be noted that it reduces the efficiency.

The higher the peptide, the more penetration and smoothness we will have (formalin stays in the cuticle tissue).

The effect of formalin on amino acid: Formalin is corrosive to amino acids, so companies today use very high amino acids in their materials if they have high formalin and use very low collagen, which only prevents the strand from thinning in that material.

The effect of formalin on collagen: Both are effective on amino acids in the material structure in one direction but with the difference that collagen primarily acts from the outer layer but formalin acts from the inner layer of cuticle tissue.

Note: A hair strand requires a maximum of 50% peptide in a standard conditions.

Formaldehyde > Formalin > Glycolic

All formalins are sensitive to direct heat (probability of material activation).

Oxygen is effective on all formalins. This is one of the reasons that materials should not be left open.

Formalin gas is volatile whether the amount of it is low or high.

Formalin-based materials do not require cover and it is best not to cover them.

And the materials that are based on glycolic need to be covered so it is better to cover them.

Formalin gas: Formalin gas more than 4% is irritant to the scalp.

Glycolic: They are strongly related to the environment (air). Formalin is a colorless and odorless gas. You may have already had liquids containing enamel used in laboratories and funerals, and have smelled it. Much smaller amounts of it are used in the products.

A study of keratin brands in 2012 marketed in South Africa found that 6 out of 7 products contained 0.96% to 1.4% formaldehyde. This is five times higher than the recommended 0.2%.

If these products are used, formaldehyde gas will be released into the air and it may be aspirated and absorbed through the

skin. It may also be quenched later when the product is spoiled.

Formaldehyde hazards

Some people are more sensitive to this chemical. Formaldehyde may increase the risk of cancer over time. A medical study has suggested that this is linked to the risk of nasal cancers and leukemia.

Formalin can have health effects on your body, such as:

Burning, itchy eyes, nose and throat irritation, runny nose, allergic reactions, cough, wheezing, chest tightness, itchy skin, rash, scalp irritation, blistering on scalp, headache, nausea, mood changes, fractures or damage to hair, hair loss.

Formaldehyde is also used in some beauty, industrial and household products such as:

Nail polish, nail glue & nail polish remover, hair glue, hair dye, hair shampoo, home furniture, plastic, paints, Detergents, textiles, pesticides

No formaldehyde label on products:

Five of the brands tested in the labs showed formalin in them, while the formaldehyde label was hacked. So we conclude that manufacturers may not be accurate in labeling products. Some companies also list formaldehyde by other names.

Formaldehyde names may be as follows:

Aldehyde, aldehyde bond, formalin, formic aldehyde, methandiol, methanal, methyl aldehyde, methylene glycol, methylene oxide, morbidic acid.

When we use keratin, the gas that is released into the air contains formaldehyde, regarding which, the American Cancer Society has pointed out that some chemicals used it to preserve products from being spoiled.

This includes:

benzylhemiformal
Diazolidinyl urea
Imidazaldinyl urea
Quaternium-15

Other options

Keratin therapy can help improve the look and feel of your hair. Other natural remedies can also make your hair look smooth and silky.

The use of iron makes the hair smooth by temporarily smoothing the strands. You can get a similar effect by using a large, dry hair brush.

Curly hair is usually drier than other types of hair. Do not wash your hair more than once every two days. Too much use of shampoo can destroy the natural hair oil.

Regularly keep the hair moist so that dry hair becomes smooth, shiny and stronger. Natural moisturizing products

can help maintain hair and scalp health. Examples of these products are:

Olive Oil, Argan Oil, Coconut Oil, Shea Butter, Sunflower Oil.

Brazilian explosive ingredients may include chemicals such as:

Formaldehyde- Formalin- Methylene glycol- Methylene oxide- Parameter- Formic aldehyde- Methanol- Oxymethylene- Kessomethane- CAS No. 50-00-0- Thymonasic Acid- Different Perfumes.

Materials

What is the effect of mixing materials with each other?

Mixing compounds with each other

Peptide: The stronger peptide dominates the weaker peptide (destroys and eats).

Amino Acid: Amino acids cannot dominate each other (two lipids never mix with each other but aggregate).

Collagen: Collagens cannot dominate one another. Collagens never mix with one another, rather they aggregate.

Note: The total structure of materials (amino acid, collagen, peptide) is 100%.

Therefore, the hair strand can absorb the whole of this structure, which is 100% and repels everything that exceeds form 100%.

The priority of material absorption is determined by the structure of produced material.

Iron (blood): Iron deficiency in the body causes hair loss and loss of hair growth.

Copper is one of the major causes whose deficiency leads to the whitening of the hair.

Phthalates (Feragrance): Their task in materials is to soften and fining the hair strands.

Moreover, it is allergen and carcinogen (for people who have allergies).

So we conclude that the structure that keeps the hair moisturized should not applied on the scalp or the hair roots much (like Iranian conditioners).

Silicone and Dimethicone: Keep your hair moist.
Advantage: It is not carcinogen and allergen agent.
Disadvantages: It thins the hair.

Vitamin C: It keeps hair fresh and makes the hair clear / collagenize for the skin.

Omega 3: One of the reasons a person has severe scalp dryness that is associated with a kind of dry fungus is Omega 3 deficiency.

Taking omega-3s hydrates skin and hair.

Note: Anything (solution or material) that is mixed with hot water indicates that collagen is found in that material or solution.

Caffeine: Its primary function is to absorb water (related to the scalp) and to help with its excretion.

Vitamin E: It is the most important vitamin for facial and nail skin that clears and hydrates the hair.

Zinc: Zinc deficiency decreases the growth rate and leads to hair loss and Zinc excess disrupts the body's hormones. Anything that affects the body's sex hormones will increase body weight and fat.

Ammonia: This compound acts like formalin and peptide in the materials so that the higher the amount of ammonia, the greater the permeability to the depth of the hair, and then the hair becomes drier.

The herbal colors are effective on the cortex and cover the cortical tissue on the melanin but if the ammonia is mixed, it will eliminate the melanin (it eats the melanin).

The more ammonia, the higher the permeability is. The more ammonia penetrates, the more pigments are removed and the hair becomes discolored.

Pigments are like boxes that are held together by disulfide bonds. 95% of people after hair loss have dry hair unless someone has a high body temperature or liver fat.

Question:

We said that formalin and Keratin should not be applied on the scalp. So what are we going to do to the scalp if ammonia contacts the scalp?

Answer: Ammonia, like formalin, stimulates the scalp to increase blood circulation. Therefore, if ammonia contacts the scalp, it will cause inflammation and a severe burning sensation.

Ammonia is used for hair dye materials.

Sometimes, due to the negligence of the hairdresser, the ammonia is applied to the skin (skin anywhere in the body) and it can cause severe allergies.

Basically, the body first reacts to this allergy with a mild inflammation that most people overlook, but later this inflammation becomes more and more. As a result, the body's immune system produces antihistamine to confront ammonia that leads to hives on the skin, swelling and severe skin inflammation, itching and severe burning.

Now, if the hairdresser had used an ice mold in the inflamed areas in the first place, it would have prevented these serious consequences.

Materialology (reasons behind naming materials) Botox

Materials with a peptide content of up to 10% are called botox. The purpose is repairing cuticle tissue- Botox is not able to reach the outer layer of the cortical tissue of the hair with a single therapy course (so botox is applied in three courses).

Protein

Materials containing 10 to 30% peptide are called proteins (collagen, nano-Keratin, protein). The use of nano prefix prior to material implies protein-based structure. The purpose is repairing the cuticle tissue and the cortex's outer layer.

Keratin

Materials containing 30-70% peptide are called keratin. This structure may not be based on active amino acid, effective collagen, or amino acid and collagen do not overcome each other. The purpose is repairing cuticle tissue and destroying hydrogen bonds of the cuticle tissue.

Element

Materials containing 70-80% peptide content are called elements. When elements are combined with high percentage formalin, very severe damage is happened to the hair. Sometimes high peptide levels and lower formalin levels are used that results in less damage. But the least formalin used in the elements is 8%. Elements are not suitable for the thickness of the thin strands, so many brands use the keratin structure with the element's name for the thin strands.

The peptide permeability decreases with low formalin percentage and as a result we will experience less smoothness. Because peptides are like a rechargeable battery, the more they penetrate, the more they will be consumed, so the formalin is the battery charger and the peptide is the battery power.

In general, materials based on Joixen or chocolate have less effect on hair color and have less hair discoloration effect.

Japanese smoothness

Materials containing 80 to 90% peptide are called Japanese smoothness (old darks)

Rebounding

Materials containing 90 to 100% peptide are called reboundings.

Intensive care is from day 1 to day 21 after therapy

Primary care is from 21 days to 3 months after therapy

Initial stability of therapies is 21 to 3 months.

Secondary stability is from 21 days to 6 months.

Maximum efficacy of therapy is appeared on the hair 21 days after the action.

Botox

They are amino acid-based or collagen-based. Acid-based botox is generally high in concentration. Collagen-based botox is less concentrated than amino acid-based botox (lower concentration)

Based on the structural principles of these materials, therapies must be done three times with a 21-day interval for optimum efficiency^[5].

- The color of the material is not a criterion for recognizing the amino acid based structure* but companies in general use orange, pink or purple colors with high concentrations.
- Collagen-based botox is less concentrated.

To understand the structure, basically green, purple with low concentration, blue with low concentration and white are used. Almost the majority of brands in the world follow this rule.

All botox materials have a very low gas content because formalin is low in the structure.

Collagen-based botox materials must be washed from hair before ironing.

All botox materials need covering because they are glycolic based and, in combination with oxygen, may not have ideal efficiency.

Ceramic or tourmaline ironing disc materials are better for Botox (For damaged or thin strands).

Minimum ironing is 3 times and maximum ironing is 7 (best performance). * The strand is damaged, so we should not damage the hair by ironing; we should be careful about the screen and the frequency of ironing.

In all therapies, the maximum ironing time is 12, and further ironing will damage the cortical tissue.

All botox materials can be combined with Lpp, Plex, organ oil.

Composition ratio for elastic strands is 10: 2 and for other strands is 10: 1.

Botox Combination

Botox / Plex Combination: We use this combination when it is intended to be a background for another therapy in the future.

Botox / Organic Oil Combination: We use this combination when the hair is very dry and fragile.

Botox / Lpp Combination: This structural combination can be used for all damages. For highly damaged cases, use it as the background therapy, and for less damaged strands use the structural combination of therapy.

LPP cannot be a protective layer for the outer tissue of the cuticle so it cannot be used as a protective layer during the brushing.

Botox can be quarantined or not, but most brands are not quarantined. Given that botox materials are high in amino acids and collagen, if left on the hair for 72 hours, they are likely to have a damaging effect on the type of the hair (altering the pH of the hair).

Because if the amino acid stays on the hair for 3 days, the hair becomes greasy and if the collagen stays on the hair for 3 days, it will dry the hair.

Botox should be washed 2 to 4 hours after the therapy, then be washed with a shampoo or hair conditioner to close the hair follicles.

If it is amino acid based: Quarantine termination for botox materials starts when we have hair ironed, leaving no trace of iron heat on the hair for up to 24 hours (provided that it is amino acid based).

If it is collagen based: Quarantine termination on these types of botox materials is when no traces of heat are left on the hair.

When we want to use Botox material on the basis of not changing the hairstyle (not to affect the hair type, for example, do not lose hair curls) and we have curly hair, we use a Babyliss with a ceramic plate (metal disc leads to split ended hair).

Important Note: When using Babylis, we also iron the hair on the direction of the hair's natural curls.

Important points:

- Metal plates lead to split ended hair.
- Masks have little amount of citric acid in their normal condition.
- Conditioners have high citric acid content.
- Case One: Masks do not contain conditioner.
- Case Two: If the masks contain Florence...
- Botox get smeared on the hair.

The higher the formalin, the more it burns the throat and lungs and has the greatest effect on the lungs, resulting in lung cancer.

Normally, the higher the gas, the higher the formalin content. Glycolics are not allergens, but formalins are allergens.

Materials with 4% glycolic acid have less gas than formalin 4%.

There are no vials that do not require ironing, so a vial containing a peptide is not a vial.

So in general everything that is ironed has peptides and formalin.

The cuticle tissue is 6 layers. Repairing the cuticle layer takes approximately 6 months to be completed.

Proteins (Nano)

Materials of this structure can be quarantined up to a maximum of 72 hours (that is, if it did not have quarantine you can also use as quarantined).

Collagen materials have no quarantine, that is, all materials that are based on collagen structure must be rinsed off the hair prior to ironing, but how much raw material should be rinsed off the hair?

It depends on the effect of collagen on the hair.

Sometimes we rinse 100% and sometimes 50% and sometimes we add a flexible layer (such as argan oil, two-phase spray, anti-heat spray).

Our method of detecting the effect of collagen on the hair is: 1-Applying the material from a distance of half centimeter to the root (using more keratin and less Botox) with the corresponding maximum time (always for any product based on the thickness of the hair except the rebounding).

Sometimes with cover and sometimes without cover (whether glycolic or not)

But all of them could be covered (since they have very low formalin levels when they contain collagen, so be careful not to damage the hair root with formalin even if there is a 1% chance).

We can make an artificial fumigation for collagen materials (15 minutes) (artificial fumigation always should be covered then blow with a dryer).

After the maximum material time, we remove the cover. We dry material 100% with a mild heat dryer.

1. The material should have no flexibility (dry and rigid).
2. If the material is like plaster or wood, we will rinse the material 100% but if the material had no flexibility and no dryness like plaster on the hair we will rinse the material 50%.

And then with a mild heat hair dryer, again, dry the material 100% on the hair.

Now the material on the hair should be flexible but if you see no flexibility again we will rinse all the material from the hair. Then continue the therapy process.

The higher the hair is greasy, the longer it takes to apply lukewarm hair dryer to the material.

Collagen recognition in a material

All collagen-based materials are powder-like or highly concentrated.

The cream like materials are based on 2 milliliter of water per 2 gram of powder.

Every 100 gram is equal to 126 milliliter.

Basically, materials containing 5% formalin use a metal bottle.

High collagen materials are the best material for thin and smooth oily hair that can deliver excellent performance.

If the peptide is 1% and the amino acid is 50%, it is forbidden for thin strands` work.

As long as the peptide is 50% in one material and the amount of collagen in the material is very low (ie less than 10%) we cannot use it for thin strands.

Material in Glycolic Product:

When the material in the container is split into two colors or watery and concentrated parts, it contains glycolic and formalin but based on glycolic.

Proteins

They are mainly based on amino acids and sometimes based on amino acids and collagen (without affecting the type of the hair).

Very high amino acid-based materials dry on the hair later (approx. 5 minutes), which sometimes gives the person a heavy feel on the hair. It is the best way to identify proteins when used in therapy.

We can use proteins to circumvent the structural rules of Botox. So that if Botox needs three courses of 21 days to one month for a long-term effect, with the protein, this three courses become two.

If the hair comes out of the root as damaged, then the problem is in the root of the hair and then the treatment with vitamin A is a priority^[6].

A tip:

With protein structures, we can also bypass the conventional way of consuming by doing professional brushing the first day and ironing the second day (but cold brushing).

Professional brushing: We say professional brushing if it is hot or cold (cold for high formalin and only for thick hair strands)

Cold Brushing: One-day closing of the hair follicle that can be reopened by ironing with the aim of formalin activation

A tip: Brushing with heat for the first day and then ironing with cold iron (like ice). If you don't have a cold iron, use ice, very cold towels, ice presses, ice caps.

Note: Proteins and collagen can be combined with plexes (ie, amino acids) and LPPs.

Combination rate: 10 to 2 for elastic hair damage and 10 to 1 for non-elastic hair.

Keratin:

This compound can never be combined with any other compounds neither keratin compounds (meaning any other brand with different peptide and formalin levels) nor plexes or multiplexes or LPPs or elements and rebounding.

Formalin is the priority and structural base of this material. The higher the formalin content in these materials, the more bleaching we will have (whether it is formalin or its derivatives).

The higher the beta formalin content of the material, the higher the gas and the thinner and the more dilute materials will be.

The expiration date of the materials is 4 years in the standard conditions and sometimes five years.

In sealed bottles, paraben (preservative) is used in above and bottom of the bottle which, when opened, paraben combines with oxygen and thus retains its performance over time.

The expiration date on the bottle is inserted as 12m. It means that this material will expire after 6 months after opening. Formaldehyde: There are keratins that are based on this structure (old materials). They have a very high gas content and can have a high concentration (formaldehyde materials are more dilute).

Sometimes these materials have no gas (the gas is very low) but have very high decolorization rate and are generally high in concentration, indicating the decomposition of formalin in this structure, which most companies today say that ironing should be done on the hair before, whereas we only do this only on very high collagen-based materials.

If you don't rinse substances like this (Keratin containing alpha-formalin) and do brushing and then ironing, you'll have 100% hair loss. This effect will appear after three days or three years, but the thing that is clear is that the formalin effect remains in the body, so we cannot use these materials for youngsters or people who are allergic or in menstrual period, or who have scars or cracks on their scalp or people who are pregnant.

Basically, in keratin-containing materials with high smoothness, 50 to 70% of peptide content is used but if these peptides are combined with alpha-formalin, it damages the cortical tissue of the hair, which has nothing to do with long-term repair.

The reason that the materials are quarantine based or not quarantined is that the essential oil used in the material stays on the hair.

That is, if we use a quarantine-free material as a quarantine material, the customer will encounter essential oils when inhaled, which can cause eye damage and the customer will face a layer created on the cornea.

Amino acid:

Quarantine duration is very effective on amino acids because amino acids are a lipid layer that affects the environment if we use quarantine-free material as a quarantine.

Amino acid-based quarantine-free materials add more lipid layer to the cuticle tissue than quarantined materials.

Coconut oil is one of the foundations of the free formalin materials (the essential oil is usually derived from coconut).

To get the most smoothness out of this material, a titanium or nano-titanium iron will have the best performance.

All keratin materials require brushing to achieve maximum smoothing efficiency. If their formalin content is high, then we will use cold brushing and if the formalin level is low, we will use hot brushing.

Keratin materials that have a formalin content of 3% and lower (beta formalin) have very low gas contents.

Elements:

This compound has a much higher durability than keratin, typically containing 2% formalin (beta), and the majority contain formalin from the alpha group.

The name of the element is due to the peptide percentage of 70-80%.

The treatment of these brands is essentially similar to keratin and the majority don't need quarantine or need 1 day quarantine.

Most elements use a glycolic compound, so the majority will be covered.

Eight percent glycolic acid is stronger than 8 % formalin. Power balance between materials:

The strength of 4% glycolic equals to the strength of 4% formalin.

But the strength of glycolic more than 4% increases and acts several folds of formalin.

In the elements, it is best to inject lpp into the scalp then cover it. It can also be used without the cover but the cover gives us better efficiency.

Sometimes the skin has acne.

Question: Why is acne created?

A: The body has reacted to some of the items and wants to repel them.

Elements that are intended to be used for repairmen and don't have any bleaching and have a very high gas content are essentially keratin.

Japanese smoothness and rebounding:

The higher the quality of these compounds, the more damaging on the cortical tissue (disulfide bonds) will happen. Japanese smoothness have three-day quarantine, but unlike them, rebounding is without quarantine.

Nowadays, new rebounding materials have emerged that have a single phase and are used as keratins that are rinsed before ironing, known as 3in1 phases.

Consumption method of all materials:

1. Opening the hair follicle

Normal and oily strands use high pH shampoo (the standard is pH: 9).

But if dry hair was fragile, we would use a pH of less than 9.

Tip: Use lukewarm water when rinsing.

2. Hair drying

We should dry 80 % of hair moisture (It should be just a bit moist).

3. Material use

We use materials that have a peptide content of up to 70% with half a centimeter distance from the root and materials that have a peptide of 70 % to 80 % and have formalin (glycol) 8 in their structure similar to elements.

But we use materials that have more than 70 % peptide and are based on alpha-formalin from one centimeter distance to the root.

For vials: All vials are applied from half centimeter distance to the root except Q10.

We can apply them to the roots. Plex is a type of vial.

For Citric Acid:

Materials containing less or high citric acid can be applied to the scalp and hair except for white acids of medium diameter that should only be applied to the strand and from a half a centimeter distance to the root.

For Masks: Apply masks that have this plan to the scalp and hair and they must have collagen. Apply masks that are specific to the hair from a half centimeter to the root.

4. Cover

For Materials: Glycolic-based materials should be covered and we measure the pause time based on the thickness of the hair strand (45 minutes for thin strands and 1 hour for thick strands).

Now if the material was in the category of botox or protein (including collagen) materials, we must create artificial fumigation for 15 minutes (behind a hot hair dryer cover)^[7].

For vials: We cover all the vials and we can create an artificial fumigation for the vials.

For Masks: We cover the masks for better efficiency and create an artificial fumigation for them.

For Citric acid: All citric acid materials give us a much higher yield if you cover it and you can create an artificial fumigation for them.

5. Pause Time

For Materials: For materials with a maximum of 80 % peptide content, we pause 45 minute for thin strands and 1 hour for thick strands.

For vials: All vials can be paused for up to one hour, but the least pause time for them is 15 minutes.

For Masks: All masks require a minimum of 15 minutes pause (7 min bath time) and maximum 30 minutes.

For Citric Acid:

Large Citric Acid Materials: Pause 6 to 12 hours and Use them Every 15 Days.

Medium citric acid Materials: At least use them up to a day if it is applied close to the root (at a distance of about half or a centimeter).

Otherwise 2 days:

Small Citric Acid Materials: If we applied it to the scalp, the pause time is 6-12 hours and if applied to the hair strand, it does not need to be rinsed but it can be rinsed.

6. Drying:

All materials should be dried with lukewarm heat.

Exception: Rebuilds are rinsed off the hair after a knot test.

For vials:

If the related vial in section 3 with pause time of number 5 was a class of LLP-based vials intended to be used on a LPP-based repair, we can then apply the LLP-cream based material to the hair and pause 15 to 45 minutes.

We can even apply masks on vials.

Masks: These compounds can be dried 100% for healthy hair. This mask can be brushed (special mask for beauty salon).

Collagen-based masks (collagen-dominated) cannot be dried but must be rinsed off the hair.

For citric acid: This compound should be dried 100% with lukewarm hair dryer.

7. Brushing

For collagen:

The collagen is first rinsed off the hair and then dried 100% with lukewarm air.

Tip: If you want to do brushing on this material, be sure to apply a small citric acid before brushing.

For Botox:

These compounds, if they are collagen-based, are first rinsed off the hair, then they are dried with a lukewarm hair dryer, but if we intend to comb the hair while we are brushing, we use an oil with small citric acid.

Comb brushing: We take the comb under the hair and keep the hair dryer far.

Amino acid-based botox are dried with a 100% lukewarm hair dryer and then you can do the comb brushing.

For Proteins, Keratins, Elements and Nanos:

Each of these materials that are based on alpha-formalin (without gas and high smoothness) are rinsed 100% with lukewarm water.

But if the materials were from beta-formaldehyde-based group and the hair strands were not damaged and the material was applied with a smoothing intent, we would use brushing (experience has shown that materials with a formalin content of more than 4% have a much better efficiency with cold- hair dryer but warm air could be used too).

Materials intended to be repaired do not require brushing but we can use a comb dryer.

Glycolic based elements: We do brushing.

We rinse alpha-formalin-based elements off the hair, then dry with a 100% lukewarm hair dryer and then do brushing.

Japanese smoothness and rebounding: In these compounds, we use the comb hair dryer to open the knots (hot hair dryer).

8. Ironing

Types of ironing

The type of the ironing plates is related to the thickness of the hair and the amount of hair damage.

Ceramic:

Basically, a high quality ceramic plate cannot be heated above 220 ° C.

We use these types of irons for thin strands or strands with severe damage (high elasticity or fragility). Because ceramic

irons cause very low damage to a hair strand. It could be even said that the risk of the burning the hair is very low.

So we conclude: These plates have the best performance for materials that are intended to be repaired. These plates are sensitive to formalin because formalin can remove ceramic glaze.

Ceramic plates are single-layered or multi-layered or all-ceramic

Note: Pure ceramics are basically black. The mixture of ceramic and tourmaline is equal to the colored plate.

Tourmaline: These types of plates give the maximum heat of 230° C.

The sound of these types of plates is like hitting a cardboard or cloth sheets if the tourmaline is pure.

It shows the best efficiency on the thin damaged strands in case the intention is smoothing.

Tourmaline irons can be called neutral iron that can be used for all damages and all the thickness range of the strands. Basically, tourmaline irons don't burn the hair.

Titanium: The titanium plates are of the advanced metal type, the higher the amount of ion used in it, the higher the price of it is^[8].

In the global market, high quality titanium with high amount of ion equals silver.

This type of plates will give the temperature of 450 Fahrenheit degree in standard conditions which is sufficient for hair because the temperatures higher than that will increase the likelihood of damage and because we know the temperature is provocative, high temperature is not very rational. These plates give us the best performance for materials with a peptide content of 50% to 70%. These plates are suitable for medium to thick hair strands and give the best performance for both types of hair.

In the normal condition, people who want to smoothen their hair use these types of plates, so we should know that the principle of naming an auto-keratin is not ceramic but titanium.

The higher the ion content in the material of the ironing plates, the higher the performance we can get from a material. So it is a common mistake that the higher the temperature of the iron, the higher the efficiency, because a hair requires only a maximum of 232 Celsius degrees.

Minimum times of ironing for a hair strand is 3 times and up to 12 times as long as it is used for therapy.

Any material type of the plate will be damaging if it is used more than 12 times.

All ironing types are followed by a split end hair, the background of a split end hair starts when a hairdresser starts therapy with it so it needs to be known that tipping is a priority.

Tipping: Short finishing and cutting angle

Sometimes people think that if they use a split ender instead of tipping, they will have better results but this is a common mistake because after finishing the ironing, the hair is suitable to grow as split end but there is not split end hair yet to use the split ender to remove it.

Split Ender:

Sometimes people use this device for cutting split end hair, but after that they leave the hair and they be unaware that the blades in a split ender is a metal and makes the hair a bit fizzy, it makes sense that we use this device before starting a therapy, not after the therapy.

Note: In either case, the hair should not be heated.

For example, after ironing, do not immediately intend to tip the hair.

Washing should be done at 90 degrees, that is, a 90 degree angle to the hair between the root and the scalp, not opposite the hair.

Why 90 degrees angle? The reason we say the angle should be 90 degrees is that at this angle the root of the hair is less stressed and the root does not curl itself, so we prevent the initial wave from the root.

Hair Conditioners

These compounds close and lock the hair follicles. Any process starts with high pH shampoo (opening hair follicles) and ends with conditioners that close or lock the hair follicles.

Exception: Only ice-ironing or freeze-ironing therapy is performed after conditioning.

Phthalates, silicones, remote icons, are base of conditioners.

The conditioner should not contain sodium.

Conditioners are of two types.

Daily conditioners: These can be used up to two to three days at a time, because it closes the follicles temporarily.

Beauty salon conditioners: These are used every 21 days after highly preserving therapies.

So the use of conditioners that are not specific to daily therapies will cause hair to become thinner in more frequent uses.

The conditioner has a pause time of two minutes and more time will make the hair thinner.

People who use materials to smoothen their hair, need conditioner to reduce smoothing time.

People who are using therapies for restoring the hair or using ammonia-based therapies, need hair masks.

Hair dryers

The hair dryer should never touch the cold skin, so if we pull the out heat pipe of the hair dryer to the scalp, it would be completely inaccurate. We should try to get the hair dryer set at a 75 degree angle to ourselves and never set it at a 90 degree angle.

Oils

Small Citric Acid (Such as Argan Oil):

Argan:

The oils adjust the pH of the hair and give the best performance for women with oily hair or with dandruff if we want a daily shampoo that is anti-dandruff; this is the best option for women.

Grape Core: This vitamin E-based compound is one of the best and top options for scalp and it has a faster absorption than other oils.

Maca Core: These compounds contain a type of keratin.

Jojobaya Oil: They contain the highest amount of pro-vitamin than all the oils that are present.

Rose Oil: These compounds contain Vitamin E and Vitamin C and have a great effect on face and skin.

It can be used for normal and dry strands.

Ant Oil: This oil is based on amino acid.

Bitter almond oil: This oil contains high vitamin C.

Medium citric acid:

Keratin Serum: In the nature, citric acid structure is large or small but human has manipulated it in the keratin structure and we can't apply this type of citric acid to the scalp. It is internationally known as a sunscreen for hair. This compound is harmful for the lipid strands because it is not absorbed completely. All keratin serums are industrial.

In climate:

Dry and temperate climate (such as Yazd¹ and Esfahan²): Normal and dry hair can use this oil but is forbidden for oily hair.

Sultry climate: Normal and dry hair can use Argan serum.

Large citric acid:

Coconut oil: It is one of the strongest antibacterial agents among all oils and it is amino acid-based.

¹ One of the provinces of Iran

² One of the provinces of Iran

Olive Oil: This citric acid is collagen based and it is an antibacterial agent.

Sesame oil: It is based on amino acid.

General outcome:

We should use small citric acid as a daily treatment to protect hair strands and use large citric acid for long-term restorations and application to the scalp.

Devices:

Fumigator:

Devices based on hot fumigation are intended to open hair follicles.

Neutral fumigation: The purpose of these devices is to help the material penetrate the cuticle tissue.

Cold fumigation: The purpose of this fumigation is only to close the hair follicles. It is also an antibacterial agent for strengthening the root and reducing hair loss.

Heat:

Wind-based heats: These kinds of heat only affects the outer area. In normal conditions, it only dries the outer layer.

Non-wind based heat: (ironing not included) Like ring hair dryer.

Auto-vibration:

In the past, people used the iron close to the root by hitting for two reasons:

1. Avoiding freezing near the root

2. Helping to increase the absorption of the material

Today, vibration-based irons are in the market to replace the initial hitting process. We can use this tip a lot. Vibration is a stimulant for the hair, then we can use vibration for the first three ironing and then disable the vibration.

Iron with high ion content is good but it is important that the temperature remains the same across all parts of the ironing plate (test with a thermometer).

CONCLUSION:

No material is better than any other material, but the material must be selected according to the type of hair, weather and internal symptoms of the body. That material is best for a person.

Best regards to all brands

REFERENCES

1. Robbins CR. Chemical & Physical Behavior of Human Hair, 2nd Edition. Springer, Verlag New York, Berlin, Heidelberg, London, Paris, Tokyo, 1994.
2. Albert's B, Barry D, Lewis J, Raff M, Roberts K & Watson JD. Molecular Biology of The Cell, 3rd Edition, Garland Publitioning, Inc., New York & London, 1994.
3. Hair Follicle, Differentiation under the Electron Microscope- An Atlas, 6 Chapters. Hair Cortex and Hair Cuticle, 2005; 45-62.
4. Ito S & Wakamatsu K. Pig. Cell, Res. 11, 1988; 120-126.
5. Gloor M, Kohler H. On the physiology and biochemistry of the scalp and hair lipids. Arch Dermatol Res. Jan 31; 1977; 257(3): 273-9.
6. Oshimura E, Abe H, Oota R. Hair and amino acids: the interactions and the effects. J Cosmet Sci. Jul-Aug; 2007; 58(4): 347-57.
7. Plowman JE, Paton LN, Brison WG. The differential expression of proteins
8. Stryer L. Biochememistry, 3rdEdition. W.H. Freeman and co., New York, 1988.